MINISTRY OF DEFENSE

Strategic Projects
# TABLE OF CONTENTS

**INTRODUCTION**  
5

**STRATEGIC PROJECTS | MINISTRY OF DEFENSE**  
7

- H-XBR  
- SGDC PROJECT  
9
10

**STRATEGIC PROJECTS | BRAZILIAN NAVY**  
12

- PROSUB  
- PNM  
- SisGAAz  
14
17
18

**STRATEGIC PROJECTS | BRAZILIAN ARMY**  
20

- SISFRON  
- GUARANI  
- CYBER DEFENSE  
22
23
26

**STRATEGIC PROJECTS | BRAZILIAN AIR FORCE**  
28

- KC-X PROJECT  
- F-X2 PROJECT  
- A-DARTER PROJECT  
30
31
33
INTRODUCTION

Currently, Brazil has a Defense Industrial Base (IDB) in full renovation process, which has allowed the country to be more competitive in the international market. The equipment produced by the national defense industry has increasing technological capacity and is present in several areas, from food - such as ready-to-eat meals - to weapons, ammunition, tanks, parachutes, radars and large aircrafts, for example.

This promotion to the sector, creating conditions for the country to re-occupy a prominent position in the international market, is directly connected to an effort by the Federal Government, through the Ministry of Defense and the Armed Forces, to associate the recovery of the operational capacity of the Navy, Army and Air Force to the creation of opportunities for Brazilian defense industries.

The National Defense Strategy (END, in Portuguese), launched in 2008, established not only the need to restructure the operational capacity of the armed forces, but also highlighted the importance for the national defense industry to become a prominent provider of such equipment. Thus, the industry now has a number of incentives such as specific legislation - Law n. 12,598, establishing a special tax regime (RETID) and prioritizing the development of critical technologies to the country.

The combination of these incentives with the inclusion of national industries in all Strategic Projects of the Armed Forces provided a boost in the sector. According to the Ministry of Defense, in 2014 alone, defense product exports were authorized in amounts exceeding USD 600 million. The positive effects are also reflected in job creation. According to the Brazilian Association of Defense and Security Material Manufacturers (Abimde), in the armaments segment alone, the number of employees went from 4,000 in 2007 to over 7,000 in 2013.
Strategic Projects
MINISTRY OF DEFENSE
Obtaining joint equipment through scale economy, that is, allowing a single product to meet the operational needs of the three armed forces, is a measure identified as essential to optimize resources. Acquisitions involving technology transfer and absorption, making the country depend less on foreign expertise, are also crucial for countries that wish to have a robust defense policy, while remaining competitive in the global market.

In this context, the H-XBR Project was created, providing for the acquisition of 50 EC-725 transport helicopters for use by the Navy, Army and Air Force. A pioneer in the joint acquisition mode, the project is a landmark of Brazil’s entry in the production of rotary-wing aircrafts of this size.

Thanks to this project, the country that once had expertise restricted to the manufacture of aircrafts currently has companies and professionals able to develop and manufacture helicopter parts and components.

In addition to the implementation, in Brazil, of the aircraft production line and full capacity to support and maintain this type of helicopter, a factor that encourages the production of components for the domestic industry, an engineering center for helicopters is also planned to make it possible for aircraft modification projects in the country.

The EC-725 performs tactical transport missions, with troops, cargo, refueling, search and rescue, combat and clarification and marine surface protection missions. In addition to that, helicopters are considered critical to provide support in public calamities like flood rescue and transport, for example.

In 2014, the first aircraft was delivered that had all of its production stages in Brazil, which represented a milestone for the H-XBR Project and for the domestic industry.
Of the 50 aircrafts included in the contract, 16 will be for the Brazilian Air Force, 16 for the Brazilian Army, 16 for the Navy and two in the Air Force Command to serve the President. So far, 15 aircrafts have been delivered: four to the Navy, five to the Army and six to FAB (Brazilian Air Force) and two to the President’s service.

SGDC PROJECT
GEOSTATIONARY SATELLITE FOR DEFENSE AND STRATEGIC COMMUNICATIONS

Starting in 2016, Brazil will have a safer and independent way to manage its information traffic with the launch of a Geostationary Satellite for Defense and Strategic Communications (SGDC).

The program’s goal is to provide safe and sovereign means for strategic and defense communications, in addition to bringing to the country critical space technologies through technology transfer and absorption programs.

The artifact will be the first to be 100% controlled by Brazilian institutions, giving Brazil full control of the information orbiting the national territory. This is because the satellite will have an exclusive military band, which will ensure full security for transmissions of strategic information in the country. This will bring even greater knowledge and autonomy in various safety operations, giving strength to projects such as the Blue Amazon Management System (SisGAAz) and the Integrated Border Monitoring System (SISFRON).

With regard to the areas of technology absorption and transfer, the project represents advances. In addition to providing knowledge to aerospace companies, coordinated by the Brazilian Space Agency (AEB), about 100 other Brazilians from the Ministry of Defense and agencies that control and maintain the artifact in orbit have participated in training for technology absorption on the premises of Brazil’s partner company in the project, Thales Alenia Space (TAS), from France.

This training process will also serve to support the Strategic Program for Space Systems (ESSP), which provides for the construction of other new satellites with the participation of the domestic industry.

The Geostationary Satellite for Defense and Strategic Communications has its delivery scheduled for July 2016, and its launch should take place in the same year, in the Kourou base in French Guiana.

In addition to the fully secure communication in its military band, the SGDC also provides Internet coverage for 100% of the Brazilian territory. Being a satellite for defense and communications, the device will feature ‘Ka’ band, which will provide Internet access to more remote regions of Brazil, which still depend on the construction of fiber optic routes for access to the network.

The total project cost is approximately BRL 1.7 billion, with investments in the Defense area of BRL 489 million. The project is included in the Growth Acceleration Program (PAC), which proves the commitment of the federal government with a fully functioning SGDC and the consequent independence of its information.
Strategic Projects

BRAZILIAN NAVY
**PROSUB - SUBMARINE DEVELOPMENT PROGRAM**

Inserted in the design of the Construction of the Navy Power Center, which aims at modernizing the operational capacity of the Brazilian Navy (MB), the Submarine Development Program (PROSUB) aims at designing and building four conventional submarines in Brazil and, finally, a submarine powered by nuclear propulsion.

To make this project happen, a gigantic structure with several sheds and workshops is being built in the municipality of Itaguaí, in the state of Rio de Janeiro (RJ), to ensure that the country has a proper facility for building and maintaining submarines.

In 2013, the Metal Structure Manufacturing Unit (UFEM) has delivered an industrial infrastructure facility for submarines, in which sections such as bulkheads, decks, tanks, fasteners and penetration parts of the hull will be assembled. In 2014, the main building of the Construction Yard was opened, while the completion of all works of this plant is planned for the end of 2015. In addition to that, by 2018 the buildings of the Maintenance Shipyard and Naval Base will be delivered, dedicated to the logistical support of submarines.

The delivery of important units that make up the project made possible for the construction of three of the four conventional submarines to begin, which are at different stages within an integrated schedule.

In addition to ensuring the sovereignty and the protection of Brazilian territorial waters, PROSUB is a major strategic project to absorb and transfer technology, placing Brazil among the few countries that dominate nuclear technology. Being an equipment with increased mobility, autonomy and underwater capacity, nuclear submarines have strong deterrent weight, discouraging potential threats.

*Construction of the first Prosub (S-BR1) conventional submarine at UFEM, in Rio de Janeiro*
Workers in the construction of submarine sections

The program stands out for its high technical qualification of Brazilian professionals who will independently have the knowledge to design and build, a submarine. To master the technology, from 2010 to 2012, Brazilian engineers, experts and workers underwent a training program in France and are currently engaged at multiplying this knowledge in implementing the program in Brazil.

PROSUB was also characterized by the strengthening of the domestic industry. On the construction of the units already delivered, more than 600 national companies were involved. At the end of the project, with the base and the shipyard, the country will be able to perform submarine maintenance and even export submarines, designed and built in Brazil, to other countries.

The expectation is that throughout the project thousands of direct and indirect jobs will be created, with skilled labor qualification.

PNM - NAVY NUCLEAR PROGRAM

Brazil could only take on the challenge of designing and building its own nuclear submarine because the country has mastered the so-called nuclear fuel production cycle, that is, uranium enrichment technique for peaceful purposes.

This was one of the main objectives of the Navy Nuclear Program (PNM) and currently a Uranium Hexafluoride Pilot Plant (USEXA) already produces the fuel on a test scale. The next step is the industrial scale production of nuclear fuel (uranium hexafluoride), which is one of the most important steps for nuclear design.

Also in 2015, the plant works are expected to be completed, which will come into operation after obtaining the necessary licenses from the National Nuclear Energy Commission (CNEN), the agency that regulates the industry in Brazil. The domain of this technology allows Brazil to have an
alternative energy source to meet domestic consumption or to sell it in the international market.

Currently, PNM also works on another challenge: designing the prototype of a nuclear reactor, a component of the model that will compose the turbine for the propulsion of the nuclear submarine, as part of the Submarine Development Program (PROSUB).

Both the manufacturing of this prototype and the several equipment effectiveness tests will be conducted at the Nuclear-Electric Generation Laboratory (LABGENE), comprised of 11 buildings that are under construction in the city of Aramar (SP).

On site, turbines and generators will take electricity to propulsion systems, making it possible for the country to start developing the technological capacity to design, build, operate and maintain a nuclear PWR (Pressurized Water Reactor). This reactor powered by pressurized water is what will make the nuclear propulsion, able to move the submarine and allow it to remain underwater for long periods.

Both the turbines and the generators were made in Brazil, in partnership with the domestic industry. In addition to that, Brazilian companies have been trained by the French company Constructions Navales et Direction des Services (DCNS), a partner of the Brazilian government in PROSUB, within the technology and nationalization projects planned in the project.

**SisGAAz - BLUE AMAZON MANAGEMENT SYSTEM**

The term “Blue Amazon” is used to refer to the entire maritime area belonging to Brazil and, therefore, has to be supervised under the responsibility of the Navy. The size of the so-called Brazilian waters is so great that it is equivalent to the Amazon rainforest area, an area that occupies almost half of the entire national territory.

To monitor this huge extension, the country will have the Blue Amazon Management System (SisGAAz), created to provide the Navy with cutting-edge means that can protect the Brazilian riches such as oil platforms and the pre-salt layer and prevent drug trafficking, piracy, among other crimes.

The complex monitoring and control system is composed of various types of sensors that integrate information and decision support networks in several levels of activity. The idea is that the system provides those responsible for monitoring all the necessary information, a sort of three dimensional x-ray that enables full situational awareness of Brazilian territorial waters, which will enable quick response to any threats detected.

Much like the Integrated Border Monitoring System (SISFRON) - created by the Army to protect the huge border area - SisGAAz will expand interagency operations, to the extent that the information gathered will be passed seamlessly to agencies such as the Federal Police, Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) and others. In addition to defense, the system will have dual use (civil and military) as it will be useful in the prevention of environmental pollution, meteorology, control of scientific research at sea and genetic heritage.

After the conceptualization phase, which involved the operational design of the system, SisGAAz is currently undergoing contracting. The Navy Directorate of Strategic Program Management (DGePEM) is analyzing the commercial proposals of companies applying to run the project.

By 2016, the name of the winning company will be announced and the SisGAAz development contract will be signed. The initial investment estimate for the project is BRL 13 billion.
**SISFRON - INTEGRATED BORDER MONITORING**

A country of continental dimensions, Brazil has almost 17,000 kilometers of borders with ten South American countries. Like every border region, drug trafficking, firearm smuggling and child sexual exploitation, unfortunately, are common and represent a major challenge to law enforcement authorities of all countries involved.

Aware of the seriousness of the problem and the increased violence that these illegal activities bring to the country, the Brazilian Army created the Integrated Border Monitoring System (SISFRON).

Currently, the greatest surveillance project for land borders in the world, SISFRON, will be permanent and extensive. It will act as a true military operation, transforming the reality of the states and towns that suffer from violence resulting from black market on the borders.

In order to monitor the territory, BRL 12 billion will be invested on the system. Leading technologies are used, while old control mechanisms give room to new appliances which, with the aid of satellites and radars, will scan the land sending encoded information to agents, in real time, who will be able to address criminal acts in both daylight and night time.

In addition to ensuring greater security for its citizens, SISFRON will foster progress for the Brazilian industry and generate jobs for the country. The technologies and equipment (75%) which are mostly used are domestic and manufactured in Brazil. For the first phase of the system alone, about 390 direct jobs and over 1500 indirect jobs have been generated.

**SISFRON pillars:**

1. Monitoring: in border areas, the system will include integrated sensing means for radar and Unmanned Aerial Vehicles (UAVs), which will monitor potential threats, unlawful acts and transnational or environmental crimes.

2. Decision Support: The information captured will follow through an information highway, to command and control centers at various levels, from small units to the area commands, where professionals from different agencies - civil and military, federal and state - will analyze and integrate data.

3. Work: part of the system will promote protection and defense actions, using the Army’s operational resources in an integrated manner with the Navy and the Air Force, in addition to federal, state and municipal authorities (interagency operations).

Currently, the SISFRON pilot project is being implemented in a 600 kilometers range of borders, in Dourados, state of Mato Grosso do Sul (MS). For this unit alone, 68 antennas were deployed and almost 8,000 direct and indirect jobs were generated. SISFRON’s next step is to expand into the North and South of the country, starting in 2016.

**GUARANI - NEW FAMILY OF ARMORED WHEELS**

“If our beloved homeland is invaded
By the enemy, in peace or war,
We defend our land
Against the danger”

-- Fibra de Herói (Hero Courage) --

In Brazil, the defense of the land against danger is not only made through vehicles that glide well on the asphalt, but also with equipment that has the ability to move in environments such as the Amazon rainforest, which covers almost half of the country.

Thinking of ensuring both mobility and security in missions in different terrains, the Armored Guarani Family Project was created. It is the development of combat vehicles on 4x4, 6x6 and 8x8 platforms, which will not only be powerful for military attack ope-
rations, but also represent a qualitative leap in defense, patrolling and peace missions.

Designed to support different climates and terrains, the Guarani family of armored vehicles will be able to conduct fast movement, not only in forest areas, but also in the crossing of rivers and streams.

With capacity for 11 men, the armored vehicle features a host of technological innovations, such as low thermal and radar footprint, which hinders its location from enemies. Seeking greater security for its members, the Guarani Family also features armor protection to piercing incendiary ammunition, GPS navigation and night vision.

With all of its technology developed by the Army Technology Center, the 6x6 Guarani Armored Vehicle will feature more than ten kinds of versions, such as mortars (to be used by the Infantry and Cavalry as weapons), communications, workshop, ambulance, engineering and chemical and nuclear defense, among others.

This shows the versatility of the equipment and its wide range of use in the Land Forces. In this category, at least 128 units were delivered to military organizations around the country. In addition to that, another 60 have been produced and are still waiting shipment.

The heaviest category of the armored vehicle family, 8x8, is being developed by engineers of the Army Technology Center, and its mock-up will be presented in 2015. The light 4x4 multipurpose vehicle is in the final phase of evaluation by the Brazilian Army, for acquisition in 2015. By the end of the project, the Army will have about 3,000 vehicles divided among the three categories.

About 90% of the components used to manufacture Guarani are made in Brazil.
An item that stands out as a priority in the National Defense Strategy (END) concerns the safety and reliability of communications at the beginning of the XXI century.

To ensure that strategic information flows quickly and safely in an increasingly connected and digitally vulnerable world, the Cyber Defense project was developed, coordinated by the Brazilian Army since 2010.

The project goal is to provide Brazil a high-level structure that involves not only military, but also people from the academic field, research and development institutions and the business sector.

One of the first steps of the project was the creation in 2010 of the Cyber Defense Center (CDCiber) for coordinating and integrating cyber defense activities under the Ministry of Defense.

In addition to the establishment of a Cyber Defense Policy, the project has enabled the national development of important software, such as the first national anti-virus, called Defesa BR, and the Cyber Operations System (SIMOC).

The latter acts as a simulator and allows those responsible for the National Cyber Defense to refine techniques to detect attacks on data networks, identify vulnerabilities, create protection mechanisms and empower HR.

In the hardware area, there is also the development of Software-Defined Radio (SDR) and the acquisition of a super computer, which is installed at the Military Institute of Engineering (IME), which enables high-level research and simulation of systems in interaction and robotics.

Within the project, there is the implementation of the National Cyber Defense School and the Cyber Defense Command, which will consolidate the country’s efforts aiming at increasing security of digital networks of interest to national defense.

In 2014, an ordinance of the Ministry of Defense established standards to enhance the Cyber Defense sector in the country and defined responsibilities to draw up projects and structures of these two agencies. The document states that it will be the responsibility of the General Secretariat and the General Staff, Armed Forces Joint Chief of Staff (EMCFA) of the Ministry of Defense to draw up proposals for the creation of supporting infrastructure, organizational structure and other measures.

In the case of the National School, a work group has been created to study partnerships that enable the project.
Strategic Projects

BRAZILIAN AIR FORCE
PROJETO KC-X
KC-390 NATIONAL FREIGHTER

Over the past decades, the Brazilian Air Force (FAB) and the Brazilian Aeronautics Company (Embraer) have focused its investment on education and research to have highly trained professionals in the country. Furthermore, they sought international partnerships that enabled the effective transfer of technology, benefiting the national production chain. All of this effort was aimed at empowering the project and developing the KC-390 freighter.

The largest aircraft ever produced in Brazil, the KC-390 also represents a milestone in FAB’s project management excellence, since it can combine the requirements and offset package emission in order to boost various sectors of the Defense Industrial Base (IDB). In all, over 50 Brazilian companies are participating in the project, which still has the support of Argentina, Portugal and the Czech Republic.

Capable of operating in various scenarios, - from the Amazon rainforest to the runways of Antarctica - the KC-390 will hold a series of logistical transport and refueling missions. For its ability to carry up to 23 tons, the aircraft can still accommodate large equipment such as weapons, semi-assembled aircrafts and even Guarani armored vehicles, Army equipment that will be used in the protection of the giant Brazilian land border.

In 2014, FAB signed a 28 aircraft purchase agreement. In early 2015, we performed the maiden flight of the KC-390, beginning the testing phase of two prototypes, expected to last until the end of 2016, when they begin deliveries of the aircraft. The 28 units will be delivered to the Air Force over a 12 year span. With a total worth of BRL 7.2 billion, the contract provides for the supply of a logistics support package, which includes spare parts and maintenance.

The national freighter is born with great opportunities for exporting to countries that also need to soon replace its aircrafts of the same size. With this, Brazil will become part of a niche market so far dominated by large international companies.

F-X2 PROJECT
GRIPEN NG

Even though it owns a good spot in the global stage, Brazil seeks to adopt measures to become increasingly competitive in the international market, such as cooperation agreements that will allow broad technological growth. This is because the country has understood that defense is one of the sectors with the ability to drive technological knowledge, increasing the export of products with higher added value and bringing benefits to the Brazilian economy.

In this context, the FX-2 project was born, which, from the need to re-equip FAB fighter planes, will represent another boost for
Brazil to incorporate significant technological advances in its Defense Industrial Base.

Just like in the 1980s, when Brazil signed a historic partnership with Italy in the AMX Project, bringing to the national domain knowledge to produce jet aircrafts, now a cooperation agreement with Sweden will lead the country to a new aerospace level. Signed in 2014 by the FAB, the contract with the Swedish company SAAB provides for the acquisition of 36 Gripen NG fighter aircrafts.

Thanks to a strategic philosophy to support the national industry, Brazil currently has companies with enough capacity to be included in the compensation package negotiated by the Coordinating Committee of the Combat Aircraft Program (COPAC) with SAAB, allowing the country to also be a part of Gripen’s development.

Brazil will be responsible for the development of the two-pilot version. The Brazilian order involves 28 single-seat units (for one pilot) and 8 two-seaters (for two crewmembers). The contract also involves the training of Brazilian pilots and mechanics in Sweden, logistical support and technology transfer to Brazilian industries. The total investment will be approximately USD 5.4 billion.

The aircraft will be used by the FAB in defense and policing of airspace attack and recognition missions. The first aircraft will be delivered in 2019 and the last in 2024.

The technology transfer process and production of the Gripen NG fighter should result in the creation of more than 2,000 direct jobs and approximately 20,000 indirect jobs in the next ten years.

**A-DARTER PROJECT NEXT GENERATION MISSILE**

Brazil has cooperation agreements with several countries and blocs, which enable the exchange of knowledge in various fields. In this sense, the A-Darter missile development project, result of a partnership between Brazil and South Africa, is emerging as one of the equipments with the largest integration between the industries of both countries and with great market potential for being a next-generation missile.

The A-Darter is a short-range missile, designed to achieve air targets up to 12 kilometers. Its main feature, already successfully tested, is the ability to execute high-performance maneuvers, due to a sensor that detects the target and calculates the best route to hit it.

Thanks to the partnership with South Africa, which since the 1960s has experience in the missile industry, currently some of the technological solutions developed for the A-Darter are already part of other products created by the domestic industry. Brazilian engineers involved in the project worked especially in the development of missile systems programming.
With 90% of the development process completed in early 2015, the missile was successfully tested with a launch made from a Gripen fighter aircraft of the South African Air Force, reaching the target after performing a 90-degree maneuver, at an altitude over 600 meters.

With this, the project entered in one of the final stages of missile development, which should be ready in the first half of 2016. The forecast is that in the future these missiles can equip the Gripen NG fighter, which will be acquired by FAB. In total, BRL 300 million were invested to date, half of it directly in domestic companies.